IN THE SPECIFICATION

1. Insert the following paragraph on page 1, after line 6:

This application incorporates by reference the contents of a 263 KB text file created September 19, 2008 and named "SN_09899575_sequence_listing.txt," which is the sequence listing for this application.

2. Delete the paragraph on page 1, lines 9-12 and replace it with:

Polynucleotides encoding antigenic Type C HIV polypeptides ~~(*e.g.*, Gag, pol, vif, vpr, tat, rev, vpu, env, and nef.)~~ *(e.g.* Gag, Pol, Vif, Vpr, Tat, Rev, Vpu, Env, and Nef) are described, as are uses of these polynucleotides and polypeptide products in immunogenic compositions. Also described are polynucleotide sequences from South African variants of HIV Type C.

3. Delete the paragraph on page 2, lines 4-9 and replace it with:

A great deal of information has been gathered about the HIV virus, however, to date an effective vaccine has not been identified. Several targets for vaccine development have been examined including the [[env]] *env* and [[Gag]] *gag* gene products encoded by HIV. [[Gag]] *gag* gene products include, but are not limited to, Gag-polymerase and Gag-protease. [[Env]] *env* gene products include, but are not limited to, monomeric gp120 polypeptides, oligomeric gp140 polypeptides and gp160 polypeptides.

4. Delete the paragraph on page 2, lines 17-21 and replace it with:

The [[*Gag*]] Gag proteins of HIV-1 are necessary for the assembly of virus-like particles. HIV-1 [[*Gag*]] Gag proteins are involved in many stages of the life cycle of the virus including, assembly, virion maturation after particle release, and early post-entry steps in virus replication. The roles of HIV-1 [[*Gag*]] Gag proteins are numerous and complex (Freed, E.O., Virology 251:1-15, 1998).

5. Delete the paragraph on page 2, line 22 to page 3, line 2 and replace it with:

Wolf, et al., (PCT International Application, WO 96/30523, published 3 October 1996; European Patent Application, Publication No. 0 449 116 Al, published 2 October 1991) have described the use of altered pr55 [[*Gag*]] Gag of HIV-1 to act as a non-infectious retroviral-like particulate carrier, in particular, for the presentation of immunologically important epitopes. Wang, et al., (Virology 200:524-534, 1994) describe a system to study assembly of HIV Gag-β-galactosidase fusion proteins into virions. They describe the construction of sequences encoding HIV Gag- β-galactosidase fusion proteins, the expression of such sequences in the presence of HIV Gag proteins, and assembly of these proteins into virus particles.

6. Delete the paragraph on page 3, lines 3-6 and replace it with:

Shiver, et al., (PCT International Application, WO 98/34640, published 13 August 1998) described altering HIV-1 (CAM1) [[*Gag*]] *gag* coding sequences to produce synthetic DNA molecules encoding HIV [[*Gag*]] Gag and modifications of HIV [[*Gag*]] Gag. The codons of the synthetic molecules were codons preferred by a projected host cell.

7. Delete the paragraph on page 3, lines 7-17 and replace it with:

Recently, use of HIV Env polypeptides in immunogenic compositions has been described. (see, U.S. Patent No. 5,846,546 to Hurwitz et al., issued December 8, 1998, describing immunogenic compositions comprising a mixture of at least four different recombinant virus that each express a different HIV ~~env~~ Env variant; and U.S. Patent No. 5,840,313 to Vahlne et al., issued November 24, 1998, describing peptides which correspond to epitopes of the HIV-1 gp120 protein). In addition, U.S. Patent No. 5,876,731 to Sia et al, issued March 2, 1999 describes candidate vaccines against HIV comprising an amino acid sequence of a T-cell epitope of Gag linked directly to an amino acid sequence of a B-cell epitope of the V3 loop protein of an HIV-1 isolate containing the sequence GPGR (SEQ ID NO:150). There remains a need for antigenic HIV polypeptides, particularly Type C isolates.

8. Delete the paragraph on page 4, lines 3-14 and replace it with:

Thus, one aspect of the present invention relates to expression cassettes and polynucleotides contained therein. The expression cassettes typically include an HIV polypeptide encoding sequence inserted into an expression vector backbone. In one embodiment, an expression cassette comprises a polynucleotide sequence encoding one or more [[*Pol*]] Pol-containing polypeptides, wherein the polynucleotide sequence comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and more preferably about 98% sequence (and any integers between these values) identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Pol*]] Pol-containing polypeptides include, but are not limited to, those shown in SEQ ID NO:30, SEQ ID NO:31; SEQ ID NO:32; SEQ ID NO:62; SEQ ID NO: 103; SEQ ID NO:58; SEQ ID NO:60; SEQ ID NO:64; SEQ ID NO:66; SEQ ID NO:68; SEQ ID NO:70; SEQ ID NO:76; and SEQ ID NO:78.

9. Delete the paragraph on page 4, lines 15-25 and replace it with:

The polynucleotides encoding the HIV polypeptides of the present invention may also include sequences encoding additional polypeptides. Such additional polynucleotides encoding polypeptides may include, for example, coding sequences for other viral proteins (e.g., hepatitis B or C or other HIV proteins, such as, polynucleotide sequences encoding an HIV [[*Gag*]] Gag polypeptide, polynucleotide sequences encoding an HIV [[*Env*]] Env polypeptide and/or polynucleotides encoding one or more of ~~vif, vpr, tat, rev, vpu and nef~~ Vif, Vpr, Tat, Rev, Vpu and Nef); cytokines or other transgenes. In one embodiment, the sequence encoding the HIV Pol polypeptide(s) can be modified by deletions of coding regions corresponding to reverse transcriptase and integrase. Such deletions in the polymerase polypeptide can also be made such that the polynucleotide sequence preserves T-helper cell and CTL epitopes. Other antigens of interest may be inserted into the polymerase as well.

10. Delete the paragraph on page 4, line 26 to page 5, line 10 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Gag*]] Gag-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Gag*]] Gag polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Gag*]] Gag-containing polypeptides include, but are not limited to, the following polynucleotides: nucleotides 844-903 of Figure 1 (a Gag major homology region) (SEQ ID NO: 1); nucleotides 841-900 of Figure 2 (a Gag major homology region) (SEQ ID NO:2); Figure 24 (SEQ ID NO:53, a Gag major homology region); the sequence presented as Figure 1 (SEQ ID NO:3); the sequence presented as Figure 22 (SEQ ID NO:51); the sequence presented as Figure 70(SEQ ID NO:99); and the sequence presented as Figure 2 (SEQ ID NO:4). As noted above, the polynucleotides encoding the [[*Gag*]] Gag-containing polypeptides of the present invention may also include sequences encoding additional polypeptides.

11. Delete the paragrpah on page 5, line 11 to page 6, line 25:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Env*]] Env-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Env*]] Env polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding Env-containing polypeptides include, but are not limited to, the following polynucleotides: nucleotides 1213-1353 of Figure 3 (SEQ ID NO: 5) (encoding an Env common region); the sequence presented as Figure 17 (SEQ ID NO:46) (encoding a 97 nucleotide long Env common region); SEQ ID NO:47 (encoding a 144 nucleotide long Env common region); nucleotides 82-1512 of Figure 3 (SEQ ID NO:6) (encoding a gp 120 polypeptide); nucleotides 82-2025 of Figure 3 (SEQ ID NO:7) (encoding a gp140 polypeptide); nucleotides 82-2547 of Figure 3 (SEQ ID NO: 8) (encoding a gp160 polypeptide); SEQ ID NO:49 (encoding a gp160 polypeptide); nucleotides 1-2547 of Figure

3 (SEQ ID NO:9) (encoding a gp160 polypeptide with signal sequence); nucleotides 1513-2547 of Figure 3 (SEQ ID NO: 10) (encoding a gp41 polypeptide); nucleotides 1210-1353 of Figure 4 (SEQ ID NO: 11) (encoding an Env common region); nucleotides 73-1509 of Figure 4 (SEQ ID NO: 12) (encoding a gp120 polypeptide); nucleotides 73-2022 of Figure 4 (SEQ ID NO: 13) (encoding a gp140 polypeptide); nucleotides 73-2565 of Figure 4 (SEQ ID NO: 14) (encoding a gp160 polypeptide); nucleotides 1-2565 of Figure 4 (SEQ ID NO: 15) (encoding a gp160 polypeptide with signal sequence); the sequence presented as Figure 20 (SEQ ID NO:49) (encoding a gp160 polypeptide); the sequence presented as Figure 68 (SEQ ID NO:97) (encoding a gp160 polypeptide); nucleotides 1510-2565 of Figure 4 (SEQ ID NO: 16) (encoding a gp41 polypeptide); nucleotides 7 to 1464 of Figure 90(SEQ ID NO:119) (encoding a gp120 polypeptide with modified wild type signal sequence); nucleotides 7 to 1977 of Figure 91 (SEQ ID NO: 120) (encoding a gp 140 polypeptide including signal sequence modified from wild-type 8_2_TV 1_C.ZA (e.g., "modified wild type leader sequence")); nucleotides 7 to 1977 of Figure 92 (SEQ ID NO: 121) (encoding a gp140 polypeptide with modified wild type 8_2_TV1_C.ZA signal sequence); nucleotides 7 to 2388 of Figure 93 (SEQ ID NO: 122) (encoding a gp160 polypeptide with modified wild type signal sequence); nucleotides 7 to 2520 of Figure 94 (SEQ ID NO: 123) (encoding a gpl60 polypeptide with modified wild type8_2_TV 1_C.ZA signal sequence); nucleotides 7 to 2520 of Figure 95 (SEQ ID NO: 124) (encoding a gp160 polypeptide with modified wild type 8_2_TVl_C.ZA signal sequence); nucleotides 13 to 2604 of Figure 96 (SEQ ID NO: 125) (encoding a gp160 polypeptide with TPA1 signal sequence); nucleotides 7 to 2607 of Figure 97 (SEQ ID NO: 126) (encoding a gp160 polypeptide with modified wild type 8_2_TV1_C.ZA signal sequence); nucleotides 1 to 2049 of Figure 100 (SEQ ID NO:131) (encoding a gp140 polypeptide with TPAI signal sequence); nucleotides 7 to 1607 of Figure 98 (SEQ ID NO: 126) (encoding a gp 160 polypeptide with wild type 8_2 TV 1_C.ZA signal sequence); nucleotides 7 to 2064 of SEQ ID NO: 132 (encoding a gp140 polypeptide with modified wild-type 8_2_TV1_C.ZA leader sequence); and nucleotides 7 to 2064 of SEQ ID NO: 133 (encoding a gp140 polypeptide with wild-type 8_2_TV1_C.ZA leader sequence).

12. Delete the paragraph on page 7, lines 3-13 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Nef*]] Nef-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Nef*]] Nef polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Nef*]] Nef -containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 26 (SEQ ID NO:55); the sequence presented in Figure 72 (SEQ ID NO: 101); the sequence presented in Figure 28 (SEQ ID NO:57); the sequence presented in Figure 67 (SEQ ID NO:96); the sequence presented in Figure 103 (SEQ ID NO: 134); and the sequence presented in Figure 104 (SEQ ID NO: 135).

13. Delete the paragraph on page 7, lines 14-23 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Rev*]] Rev-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Rev*]] Rev polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Rev*]] Rev -containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 43 (SEQ ID NO:72); the sequence presented in Figure 76 (SEQ ID NO: 105); the sequence presented in Figure 45 (SEQ ID NO:74); the sequence presented in Figure 78 (SEQ ID NO: 107); and the sequence presented in Figure 62 (SEQ ID NO:91).

14. Delete the paragraph on page 7, line 24 to page 8, line 4 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Tat*]] Tat-containing polypeptide, wherein the

polynucleotide sequence encoding the [[*Tat*]] Tat polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Tat*]] Tat-containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 51 (SEQ ID NO: 80); the sequence presented in Figure 80 (SEQ ID NO: 109); the sequence presented in Figure 52 (SEQ ID NO:81); the sequence presented in Figure 54 (SEQ ID NO: 83); and the sequence presented in Figure 82 (SEQ ID NO: 111).

15. Delete the paragraph on page 8, lines 5-12 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Vif*]] Vif-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Vif*]] Vif polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Vif*]] Vif-containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 56 (SEQ ID NO: 85); and the sequence presented in Figure 84 (SEQ ID NO: 113).

16. Delete the paragraph on page 8, lines 13-20 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Vpr*]] Vpr-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Vpr*]] Vpr polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Vpr*]] Vpr-containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 58 (SEQ ID NO:87); and the sequence presented in Figure 86 (SEQ ID NO: 115).

17. Delete the paragraph on page 8, lines 21-28 and replace it with:

In another embodiment, an expression cassette comprises a polynucleotide sequence encoding a polypeptide including an HIV [[*Vpu*]] Vpu-containing polypeptide, wherein the polynucleotide sequence encoding the [[*Vpu*]] Vpu polypeptide comprises a sequence having at least about 85%, preferably about 90%, more preferably about 95%, and most preferably about 98% sequence identity to the sequences taught in the present specification. The polynucleotide sequences encoding [[*Vpu*]] Vpu-containing polypeptides include, but are not limited to, the following polynucleotides: the sequence presented in Figure 60 (SEQ ID NO:89); and the sequence presented in Figure 88 (SEQ ID NO:117).

18. Delete the paragraph on page 13, line 11 to page 14, line 5:

In a further aspect, the present invention includes compositions for generating an immunological response, where the composition typically comprises at least one of the expression cassettes of the present invention and may, for example, contain combinations of expression cassettes (such as one or more expression cassettes carrying a Pol-polypeptide-encoding polynucleotide, one or more expression cassettes carrying a Gag-polypeptide-encoding polynucleotide, one or more expression cassettes carrying accessory polypeptide-encoding polynucleotides (e.g., native or synthetic ~~vpu, vpr, nef, vif, tat, rev~~ Vpu, Vpr, Nef, Vif, Tat, Rev), and/or one or more expression cassettes carrying an Env-polypeptide–encoding polynucleotide). Such compositions may further contain an adjuvant or adjuvants. The compositions may also contain one or more Type C HIV polypeptides. The Type C HIV ~~polypetpides~~ polypeptides may correspond to the polypeptides encoded by the expression cassette(s) in the composition, or may be different from those encoded by the expression cassettes. An example of the polynucleotide in the expression cassette encoding the same polypeptide as is being provided in the composition is as follows: the polynucleotide in the expression cassette encodes the Gag-polypeptide of Figure 1 (SEQ ID NO:3), and the polypeptide (SEQ ID NO: 17) is the polypeptide encoded by the sequence shown in Figure 1. An example of the polynucleotide in the expression cassette encoding a

different polypeptide as is being provided in the composition is as follows: an expression cassette having a polynucleotide encoding a Gag-polymerase polypeptide, and herein.

19. Delete the paragraph on page 16, line 28 and replace it with:

Figure 7 is a schematic depicting the selected domains in the Pol region of HIV. YMDD (SEQ ID NO: 148); WMGY (SEQ ID NO: 149).

20. Delete the paragraph on page 17, lines 1-10 and replace it with:

Figure 8 (SEQ ID NO:30) depicts the nucleotide sequence of the synthetic construct designated PR975(+). "(+)" indicates that the reverse transcriptase is functional. This construct includes sequence from p2 (nucleotides 16 to 54 of SEQ ID NO:30); p7 (nucleotides 55 to 219 of SEQ ID NO:30); pl/p6 (nucleotides 220-375 of SEQ ID NO:30); prot (nucleotides 376 to 672 of SEQ ID NO:30), reverse transcriptase (nucleotides 673 to 2352 of SEQ ID NO:30); and 6 amino acids of integrase shown in Figure 7 (nucleotides 2353 to 2370 of SEQ ID NO:30). In addition, the construct contains a multiple cloning site (MCS, nucleotides 2425 to 2463 of SEQ ID NO:30) for insertion of a transgene and a YMDD (SEQ ID NO: 148) epitope cassette (nucleotides 2371 to 2424 of SEQ ID NO:30).

21. Delete the paragraph on page 17, lines 11-22 and replace it with:

Figure 9 (SEQ ID NO:31) depicts the nucleotide sequence of the synthetic construct designated PR975YM. As illustrated in Figure 7,. the RT region includes a mutation in the catalytic center (mut. cat. center). "YM" refers to constructs in which the nucleotides encode the amino acids AP instead of YMDD (SEQ ID NO: 148) in this region. Reverse transcriptase is not functional in this construct. This construct includes sequence from the p2 (nucleotides 16 to 54 of SEQ ID NO:31); p7 (nucleotides 55 to 219 of SEQ ID NO:31); pl/p6 (nucleotides 220 to 375 of SEQ ID NO:31); prot (nucleotides 376 to 672 of SEQ ID NO:31); and reverse transcriptase (nucleotides 673 to 2346 of SEQ ID NO:31) shown in Figure 7, although the reverse transcriptase protein is not functional. In addition, the construct contains

a multiple cloning site (MCS, nucleotides 2419 to 2457 of SEQ ID NO:31) for insertion of a transgene and a YMDD (SEQ ID NO: 148) epitope cassette (nucleotides 2365 to 2418 of SEQ ID NO:31).

22. Delete the paragraph on page 17, line 23 to page 18, line 4 and replace it with:

Figure 10 (SEQ ID NO:32) depicts the nucleotide sequence of the synthetic construct designated PR975YMWM. "YM" refers to constructs in which the nucleotides encode the amino acids AP instead of YMDD (SEQ ID NO: 148) in this region. "WM" refers to constructs in which the nucleotides encode amino acids PI instead of WMGY (SEQ ID NO: 149) in this region. This construct includes sequence from the p2 (nucleotides 16 to 54 of SEQ ID NO:32); p7 (nucleotides 55 to 219 of SEQ ID NO:32); pl/p6 (nucleotides 220 to 375 of SEQ ID NO:32);prot (nucleotides 376 to 672 of SEQ ID NO:32); and reverse transcriptase (nucleotides 673 to 2340 of SEQ ID NO:32) shown in Figure 7, although the reverse transcriptase protein is not functional. In addition, the construct contains a multiple cloning site (MCS, nucleotides 2413 to 2451 of SEQ ID NO:32) for insertion of a transgene and a YMDD (SEQ ID NO: 148) epitope cassette (nucleotides 2359 to 2412 of SEQ ID NO:32). Figure 11 (SEQ ID NO:33) depicts the nucleotide sequence of 8_5_TV 1_C.ZA. Various regions are shown in Table A.

23. Delete the paragraph on page 49, line 24 to page 50 line 5 and replace it with:

An exemplary embodiment of the present invention is illustrated herein by modifying the Gag protein wild-type sequences obtained from the AF110965 and AF110967 strains of HIV-1, subtype C. (see, for example, Korber et al. (1998) *Human Retroviruses and Aids*, Los Alamos, New Mexico: Los Alamos National Laboratory; Novitsky et al. (1999) *J. Virol.* 73(5):4427-4432, for molecular cloning of various subtype C clones from Botswana). Also illustrated herein is the modification of wild-type sequences from novel isolates 8_5_TV1_C.ZA (also called TV001 or TVl) and 12¬5_1_TV2_C.ZA (also called TV002 or TV2). SEQ ID NO:52 shows the wild-type sequence of *gag* [[Gag]] from 8_5_TV 1_C.ZA and SEQ ID NO:54 shows the wild-type sequence of the major homology region of *gag*

[[Gag]] (nucleotides 1632-1694 of Table A) of the same strain. SEQ ID NO: 100 shows the wild-type sequence of *gag* [[Gag]] of 12-5_1_TV2_C.ZA

24. Delete the paragraph on page 50, lines 15-22 and replace it with:

First, the HIV-1 codon usage pattern was modified so that the resulting nucleic acid coding sequence was comparable to codon usage found in highly expressed human genes (Example 1). The HIV codon usage reflects a high content of the nucleotides A or T of the codon-triplet. The effect of the HIV-1 codon usage is a high AT content in the DNA sequence that results in a decreased translation ability and instability of the mRNA. In comparison, highly expressed human codons prefer the nucleotides G or C. The [[Gag]] *gag* coding sequences were modified to be comparable to codon usage found in highly expressed human genes.

25. Delete the paragraph on page 55, lines 1-10 and replace it with:

In certain embodiments, the catalytic center and/or primer grip region of RT are modified. The catalytic center and primer grip regions of RT are described, for example, in Patel et al. (1995) Biochem. 34:5351 and Palaniappan et al. (1997) J. Biol. Chem. 272(17):11157. For example, in the construct designated PR975YM (SEQ ID NO:31), wild type sequence encoding the amino acids YMDD (SEQ ID NO: 148) at positions 183-185 of p66 RT, numbered relative to AF 110975, are replaced with sequence encoding the amino acids "AP". In the construct designated PR975YMWM (SEQ ID NO:32), the same mutation in YMDD (SEQ ID NO: 148) is made and, in addition, the primer grip region (amino acids WMGY (SEQ ID NO: 149), residues 229-232 of p66RT, numbered relative to AF110975) are replaced with sequence encoding the amino acids "PI."

26. Delete the paragraph on page 55, lines 26-31 and replace it with:

The present invention also includes expression cassettes which include synthetic HIV Type C sequences derived HIV genes other than ~~Gag, Env and Pol,~~ *gag*, *env* and *pol*,

including but not limited to, regions within ~~Gag, Env, Pol, as well as, vif, vpr, tat, rev, vpu, and nef,~~ *gag, env, pol*, as well as, *vif, vpr, tat, rev, vpu,* and *nef* for example from 8_5_TV1_C.ZA (SEQ ID NO:33) or 12-5_1_TV2_C.ZA (SEQ ID NO:45). Sequences obtained from other strains can be manipulated in similar fashion following the teachings of the present specification.

27. Delete the paragraph on page 73, lines 16-19 and replace it with:

In one embodiment of the present invention synthetic Gag-polymerase expression cassettes are provided comprising a promoter and a sequence encoding synthetic Gag-polymerase protein and at least one of ~~vpr, vpu, nef or vif~~ the Vpr, Vpu, Nef or Vif, wherein the promoter is operably linked to ~~Gag-polymerase~~ *Gag-polymerase* and ~~vpr, vpu, nef or vif~~ *vpr*, *vpu*, *nef* or *vif* DNA sequences.

28. Delete the paragraph on page 73, lines 20-29 and replace it with:

Within yet another aspect of the invention, host cells (e.g., packaging cell lines) are provided which contain any of the expression cassettes described herein. For example, within one aspect packaging cell line are provided comprising an expression cassette that comprises a sequence encoding synthetic Gag-polymerase, and a nuclear transport element, wherein the promoter is operably linked to the sequence encoding Gag-polymerase. Packaging cell lines may further comprise a promoter and a sequence encoding ~~tat, rev, or an envelope~~ Tat, Rev, or an Env, wherein the promoter is operably linked to the sequence ~~encoding tat, rev, Env~~ Tat, Rev, or an Envor sequences encoding modified versions of these proteins. The packaging cell line may further comprise a sequence encoding any one or more of ~~nef, vif, vpu or vpr (wild-type or synthetic)~~ Nef, Vif, Vpu or Vpr (wild-type or synthetic).

29. Delete the paragraph on page 73, line 30 to page 74 line 3 and replace it with:

In one embodiment, the expression cassette (carrying, for example, the synthetic ~~Gag-polymerase~~ *Gag-polymerase*) is stably integrated. The packaging cell line, upon introduction

of a lentiviral vector, typically produces particles. The promoter regulating expression of the synthetic expression cassette may be inducible. Typically, the packaging cell line, upon introduction of a lentiviral vector, produces particles that are essentially free of replication competent virus.

31. Delete the paragraph on page 74, lines 4-10 and replace it with:

Packaging cell lines are provided comprising an expression cassette which directs the expression of a synthetic ~~Gag-polymerase~~ *Gag-polymerase* gene or comprising an expression cassette which directs the expression of a synthetic ~~Env genes~~ *env* gene described herein. (See, also,Andre, S., et al., Journal of Virology 72(2):1497-1503, 1998; Haas, J., et al., Current Biology 6(3):315-324, 1996) for a description of other modified [[Env]] *env* gene sequences). A lentiviral vector is introduced into the packaging cell line to produce a vector producing cell line.

31. Delete the paragraph on page 76, lines 16-22 and replace it with:

Representative examples of suitable expression cassettes have been described herein and include synthetic ~~Env, synthetic Gag, synthetic Gag-protease, and synthetic Gag-polymerase~~ *env*, synthetic *gag*, synthetic *gag-protease*, and synthetic *gag-polymerase* expression cassettes, which comprise a promoter and a sequence encoding, e.g., Gag-polymerase and at least one of ~~vpr, vpu, nef or vif vpr,~~ Vpr, Vpu, Nef or Vif, wherein the promoter is operably linked to ~~Gag-polymerase and vpr, vpu, nef or vif~~ *gag-polymerase* and *vpr*, *vpu*, *nef* or *vif*. As described above, the native and/or synthetic coding sequences may also be utilized in these expression cassettes.

32. Delete the paragraph on page 76, line 23 to page 77, line 3 and replace it with:

Utilizing the above-described expression cassettes, a wide variety of packaging cell lines can be generated. For example, within one aspect packaging cell line are provided comprising an expression cassette that comprises a sequence encoding synthetic Gag-

polymerase, and a nuclear transport element, wherein the promoter is operably linked to the sequence encoding the Gag-polymerase protein. Within other aspects, packaging cell lines are provided comprising a promoter and a sequence encoding ~~tat, rev, Env~~ Tat, Rev, Env proteins, or other HIV antigens or epitopes derived therefrom, wherein the promoter is operably linked to the sequence encoding ~~tat, rev, Env~~ Tat, Rev, Env, or the HIV antigen or epitope. Within further embodiments, the packaging cell line may comprise a sequence encoding any one or more of ~~nef, vif, vpu or vpr~~ Nef, Vif, Vpu or Vpr. For example, the packaging cell line may contain only ~~nef, vif, vpu, or vpr alone, nef and vif, nef and vpu, nef and vpr, vif and vpu, vif and vpr, vpu and vpr, nef vif and vpu, nef vif and vpr, nef vpu and vpr, vvir vpu and vpr, or, all four of nef, vif, vpu, and vpr~~ Nef, Vif, Vpu, or Vpr, Nef and Vif, Nef and Vpu, Nef and Vpr, Vif and Vpu, Vif and Vpr, Vpu and Vpr, Nef Vif and Vpu, Nef Vif and Vpr, Nef Vpu and Vpr, Vpr Vpu and Vpr, or, all four of Nef, Vif, Vpu, and Vpr.

33. Delete the paragraph on page 78, lines 3-14 and replace it with:

HIV antigens of particular interest to be used in the practice of the present invention include ~~tat, rev, nef, vif, vpu, vpr,~~ Tat, Rev, Nef, Vif, Vpu, Vpr, and other HIV antigens or epitopes derived therefrom. These antigens may be synthetic (as described herein) or wild-type. Further, the packaging cell line may contain only ~~nef~~ Nef, and HIV-1 (also known as HTLV-III, LAV, ARV, etc.), including, but not limited to, antigens such as gp120, gp41, gp160 (both native and modified); Gag; and ~~pol~~ Pol from a variety of isolates including, but not limited to, HIV_{IIIb}, HIV_{SF2}, HIV-1_{SF162}, HIV-1_{SF170}, HIV_{LAV}, HIV_{LAI}, HIV_{MN}, HIV-1_{CM235},[[,]] HIV-l_{US4}, other HIV-1 strains from diverse subtypes (e.g., subtypes, A through G, and O), HIV-2 strains and diverse subtypes (e.g., HIV-2_{UC1} and HIV-$_{UC2}$). See, e.g., Myers, et al, Los Alamos Database, Los Alamos National Laboratory, Los Alamos, New Mexico; Myers, et al., Human Retroviruses and Aids, 1990, Los Alamos, New Mexico: Los Alamos National Laboratory.

34. Delete the sequence listing filed July 23, 2007.